REMARKS

The Examiner is thanked for courtesies extended in granting an interview in the above captioned application to Dr. James Baker and the undersigned on April 14, 2005. During this interview, the history of advances in toner technology, particularly in the use of amphipathic copolymers in toners in the past and in currently pending patent applications, was discussed. The differences between copolymers prepared in aqueous media either as a suspension or emulsion polymerization reactions and amphipathic copolymers prepared in solvents as described in the present application were also discussed. The different development stages and toner discoveries for use in different printing processes were also discussed. Early systems were described having toner particles with very low Tg polymers that were imaged and adhesively transferred by an adhesive overlaminate sheet. Liquid toners, including gels, were also discussed that comprised mid-range Tg toner particles that were formed a film on the photoreceptor and transferred as a film and subsequently fused to a substrate. Phase change developer systems were also discussed, wherein a toner is provided in a system that is solid at room temperature, but which is converted to a liquid toner, for example by heating, prior to imaging. The imaging process in the phase change developer system thus is a liquid toner system.

Issues related to creation of dry toner particles from toner particles prepared in liquids, and issues related to printing from liquid toner compositions without film formation on the photoreceptor were also discussed.

Amendments

Claims 1 and 23 have been amended to insert language regarding the S and D material portions of the amphipathic copolymer. Antecedent basis for this amendment is located in the specification at page 12, lines 12-16.

The specification has also been amended to update pending application status information.

It is respectfully submitted that no new matter is introduced by these amendments.

Claim Rejections

Claims 1 and 23 have been rejected under 35 USC 112, second paragraph as being indefinite.

More specifically, claims 1 and 22 have been stated to be indefinite in the terms S and D. These claims have been amended to relate these terms to the carrier liquid.

Claims 1-27 have been rejected under 35 USC 103 as being unpatentable over Baker 6,649,316 in view of Van Ooij 5,204,219.

The present claims relate to gel liquid electrophotographic toner compositions comprising a liquid carrier and toner particles dispersed in the liquid carrier. The liquid carrier has a Kauri-butanol number less than 30 mL. The toner particles comprise a polymeric binder comprising at least one amphipathic copolymer with one or more S material portions and one or more D material portions. The toner composition comprises hydrogen bonding functionality in an amount sufficient to provide a three dimensional gel of controlled rigidity which can be reversibly reduced to a fluid state by application of energy. The electrophotographic toner composition does not form a film under Photoreceptor Image Formation conditions.

Gel toner compositions that do not substantially form a film under Photoreceptor Image Formation conditions provide specific advantages, including excellent image transfer from the photoreceptor, with low or no back transfer of the image to the photoreceptor during the printing process. Additionally, the gel toner compositions exhibit exceptional storage stability without the need to incorporate dispersant, surfactant, or stabilizer additives in an amount deleterious to image quality, although these additional components can be used if desired. Superior final image properties are also observed relative to erasure resistance and blocking resistance. The gels impart useful properties to the liquid ink, notably improved sedimentation stability of the colorant, without compromising print quality or ink transfer performance. The inks formulated with the gels also exhibit improved redispersion characteristics upon settling, and do not form dilatant sediments such as those formed by non-gelled organosol inks.

Baker 6,649,316 describes a phase change developer comprising: (a) a carrier having a Kauri-butanol number less than 30; and (b) an organosol comprising a graft (co)polymeric steric stabilizer covalently bonded to a thermoplastic (co)polymeric core that is insoluble in said carrier, and said (co)polymeric steric stabilizer comprises a crystallizing polymeric moiety that

independently and reversibly crystallizes at or above 30°C, wherein said phase change developer has a melting point at or above 22°C.

As noted in the Baker '316 specification beginning at column 11, line 52, the term "phase change developer" has an accepted meaning within the imaging art. As the term indicates, the developer system is present as one physical phase under storage conditions (e.g., usually a solid) and transitions into another phase during development (usually a liquid phase), usually under the influence of heat or other directed energy sources. Thus, in the system as described in Baker '316, the toner is converted from a solid form to a liquid form prior to development, so that the toner as described first is in the solid form, and then through a specific manipulation is converted to liquid form under image formation conditions so that the actual image formation process is carried out in the form of a liquid. See column 2, lines 21-25. This solid form is fundamentally different in nature from a gel created by molecular weight and solubility properties as required in the present claims.

Baker '316 therefore does not teach or suggest a gel toner composition comprising a gel created by utilizing hydrogen bonding functionality in an amount sufficient to provide a three dimensional gel of controlled rigidity which can be reversibly reduced to a fluid state by application of energy as presently claimed.

Additionally, Baker '316 describes a toner system wherein the toner is designed to form an image on the surface of a photoconductor with film formation on the photoconductor, which formed film is then transferred to an intermediate transfer material or directly to a print medium. See, e.g. Column 14, lines 64-65, which describes the drying of the film on the photoconductive element surface. This image formation system is in contrast to the presently claimed system, which specifically requires that the electrophotographic toner composition does not form a film under Photoreceptor Image Formation conditions.

Van Ooij describes the use of a gelled network of inorganic oxide particles on the polymeric surface of a substrate provides a subbing layer having the potential for antistatic properties, antihalation properties, and good coatability. Van Ooij does not relate to toner compositions comprising amphipathic copolymers as presently claimed, but rather to "the use of a gelled or hydrolyzed network of inorganic particles, preferably oxides, as a layer on a polymeric surface provides an excellent subbed (or primed) substrate for photographic

emulsions." See column 2, lines 12-16 (emphasis added). The Van Ooij reference thus does not relate to toner compositions at all.

It is respectfully submitted that the above discussed references would not have individually or in combination suggested the toner compositions of the present claims. Further, the skilled artisan would have had no motivation to prepare a gel toner composition as presently claimed, wherein a reversible gel having the present performance properties is formed through use hydrogen bonding functionality in an amount sufficient to provide a three dimensional gel of controlled rigidity. The references do not teach or suggest preparation of a gel toner composition that substantially does not form a film under Photoreceptor Image Formation conditions, as required in the present claims.

Finally, the skilled artisan could not have predicted that such toner compositions would exhibit superior performance properties, such as excellent image transfer from the photoreceptor, exceptional storage stability, and superior final image properties relative to erasure resistance and blocking resistance.

Claim Rejections – Double Patenting

Claims 1-27 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting over copending Application Nos. 10/612,182; 10/612,444 and 10/612,058.

In order to overcome this provisional rejection and to expedite prosecution, a terminal disclaimer in view of copending Application Nos. 10/612,182; 10/612,444 and 10/612,058 is enclosed without prejudice.

CONCLUSION

In view of the above remarks, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office action. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9811.

Respectfully Submitted,

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